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Soil microbial invasions

Patterns, mechanisms, and impacts garnered from *Escherichia coli* invasions into soil

Cyrus Alexander Mallon

1. The strength of invasion resistance is determined by the amount of available resources and the capability of the resident community to use those resources, of which the latter is a direct function of microbial community diversity. (*this thesis*)
2. Most of the time, a soil invasion by *E. coli* is unsuccessful. Assessing the strength of invasion resistance merely determines how long we can detect viable populations. (*this thesis*)
3. Species richness and evenness play complementary roles in resource exploitation. Where the presence of species indicate the potential to exploit resources, increased levels of evenness can ensure resource depletion. (*this thesis*)
4. Characterizing the overlap between the respective niche breadths of an invader and resident community provides an accurate quantification of resource competition, and, in doing so, predicts invader survival. (*this thesis*)
5. Even if it will not survive, its invasion ultimately unsuccessful, *E. coli* will still leave an invisible fingerprint on the invaded community, having impacted and altered its taxonomic and niche structures. (*this thesis*)
6. Amidst conflict and competition, there exists the potential to cooperate. (*this thesis*)
7. Recognition and understanding of the microbial invasion process provides a foundation to improve many practical applications where invaders must survive, like the development of effective probiotic, biofertilizing, and biocontrol agents. (*this thesis*)
8. “I wish somebody had given me the news that ideas don’t just fall on your head like fairy dust. You have to treat that like a job. You have to spend hours each day, where you’re just like, ‘This is the part of the day when I’m looking for an idea.’” – *Ira Glass*
9. “Human kindness has never weakened the stamina or softened the fiber of a free people. A nation does not have to be cruel to be tough.” -*Franklin D. Roosevelt*
10. Fortuna audaces adiuvat.